Claims

1. A method for treating or preventing a pathologic disorder associated with expression of an interleukin in a subject in need thereof comprising the step of immunizing said subject with a conjugate of said interleukin and a carrier in an amount sufficient to induce antibody production wherein said antibody inhibits the activity of said interleukin.

2. The method of claim 1, wherein said interleukin is IL-4, IL-5, IL-9, or IL-13.

3. The method of claim 2, wherein said interleukin is an IL-9.

4. The method of claim 3, wherein said IL-9 is a substituted IL-9 or a recombinant IL-9.

5. The method of claim 1, wherein the carrier is selected from the group consisting of ovalbumin (OVA), a substituted OVA, keyhole limpet hemocyanin (KLH), acetylated BSA, and pertussis toxin.

6. The method of claim 5, wherein said interleukin is an IL-9 having free SH groups and said substituted OVA is maleimide substituted OVA.

7. The method of claim 1, wherein said conjugate comprises a glutaraldehyde linker.

8. The method of claim 1, wherein said subject is a mammal.

9. The method of claim 1, wherein said inhibition persists for at least 9 months.

10. The method of claim 1, wherein said conjugate is administered to said subject at about 2 week intervals for a period of about 6 weeks.

11. The method of claim 1, wherein said conjugate is administered in an amount range from about 1 ug to about 10 ug.

12. The method of claim 11, wherein said amount is about 2 ug.

13. The method of claim 1, wherein said antibody is a neutralizing antibody.

14. The method of claim 1, wherein said pathological disorder is selected from the group consisting of lymphomagenesis, autoimmune diabetes, asthma, mast cell activation, eosinophilia and allograph rejection.

15. A method for treating or preventing eosinophilia or allograph rejection in a subject in need thereof comprising immunizing said subject with a conjugate of IL-9 in an amount sufficient to induce a therapeutically effective autoantibody to IL-9.

16. A method for treating or preventing eosinophilia or allograph rejection in a subject in need thereof comprising administering to said subject a therapeutically effective autoantibody specific for IL-9 in an amount sufficient to reduce IL-9 activity sufficiently to reduce or to prevent eosinophilia or allograph rejection.

17. The method of claim 15, wherein the autoantibody is a monoclonal antibody.

18. A method for inducing an elevated titre of an antibody, wherein said antibody is specific for an interleukin, comprising immunizing said subject with a conjugate of said interleukin and a carrier in an amount sufficient to induce antibody formation.

19. The method of claim 18, wherein said interleukin is IL-4, IL-5, IL-9, or IL-13.

20. The method of claim 19, wherein said interleukin is IL-9.

21. The method of claim 20, wherein said IL-9 is a substituted IL-9 or a recombinant IL-9.

22. The method of claim 18, wherein the carrier is selected from the group consisting of ovalbumin (OVA), a substituted OVA, keyhole limpet hemocyanin (KLH), acetylated BSA, and pertussis toxin.

23. The method of claim 18, wherein said IL-9 comprises free SH groups and said OVA is maleimide substituted OVA.

24. The method of claim 18, wherein said conjugate comprises a glutaraldehyde linker.

25. The method of claim 18, wherein said elevated titer persists for at least 9 months.

26. The method of claim 18, wherein said conjugate is administered to said subject at about 2 week intervals for a period of about 6 weeks.

27. The method of claim 18, wherein said conjugate is administered in amount range from about 1 ug to about 10 ug.

28. The method of claim 27, wherein said amount is about 2 ug.

29. The method of claim 18, wherein said antibody is a neutralizing antibody.

30. A method for determining effectiveness of an agent for treating a pathological condition in a subject wherein said pathological condition is characterized by a deficiency of an interleukin, comprising

(i) inducing said condition characterized by a deficiency of said interleukin by administering an amount of the conjugate of claim 40 in an amount sufficient to induce said condition,

(ii) measuring a parameter associated with said condition,

(iii) administering an amount of said agent,

(iv) measuring the parameter associated with said condition, and

(v) comparing (ii) and (iv) to determine the effect of said agent on said parameter.

31. The method of claim 30, wherein said interleukin is selected from the group consisting of IL-4, IL-5, IL-9, and IL-13.

32. The method of claim 30, wherein said pathological condition is selected from the group consisting of lymphomagenesis, autoimmune diabetes, asthma, mast cell activation, eosinophilia and allograph rejection.

33. The method of claim 30, wherein said pathological condition is eosinophilia.

34. The method of claim 30, wherein said subject is a mammal.

35. A composition comprising an interleukin conjugate and a pharmaceutically acceptable carrier, wherein said interleukin is selected from the group consisting of IL-4, IL-5, IL-9, and IL-13.

36. The composition of claim 35, wherein said IL-9 is a substituted IL-9 or a recombinant IL-9.

37. The composition of claim 35, wherein said carrier is selected from the group consisting of ovalbumin (OVA), a substituted OVA, keyhole limpet hemocyanin (KLH), acetylated BSA, and pertussis toxin.

38. The composition of claim 37, wherein said IL-9 is iminothyolane treated IL-9 and said substituted OVA is maleimide substituted OVA.

39. The composition of claim 35, wherein said composition comprises an adjuvant.

40. An immunogenic conjugate of an interleukin and a carrier.

41. The immunogenic conjugate of claim 40 wherein the interleukin is IL-9.

42. The immunogenic conjugate of claim 40 wherein the interleukin is IL-9 and the carrier is ovalbumin and the conjugate comprises a glutaraldehyde linker.

43. The immunogenic conjugate of claim 40, wherein the interleukin is an IL-9 comprising free SH groups and the carrier is a maleimide substituted ovalbumin, wherein the IL-9 and the OVA are conjugated through a maleimide group on the OVA and a free SH group on the IL-9.